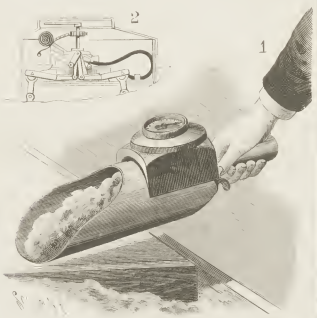
AN IMPROVED WEIGHING SCOOP.

The illustration represents a convenient device for use in the household, in hotels and warehouses, and by retail merchants and others. In connection with the usual pan of a scoop is arranged a scale mechanism, whereby the contents of the pan may be weighed and the weight indicated by a pointer moving on a dial face, as shown in Fig. 1, Fig. 2 representing a sectional view of the scale mechanism. The invention has been patented by John M. Withrow and W. H. Theobald, of Apalachicola, Fla. The scale mechanism is carried by a sunken portion of the bottom of the casing to which the handle is secured, the handle portion having skirts forming a downwardly opening cavity receiving the upper portion of the scoop or pan. At each side of the pan are links with eyes in which are knife edges resting upon pairs of arms connected by beams, each beam with its arm forming a lever rocking on a fulcrum formed by knife edges for each arm rolling in bearings on the braced bottom of the handle casing. The intermediate portion of each beam is connected by links to a carriage which slides vertically

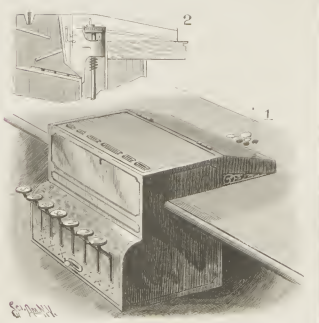


WITHROW AND THEOBALD'S WEIGHING SCOOP.

on the arbor carrying the pointer of the scale, a scroll spring being arranged to normally lift the pan. Weight placed in the pan causes the arms which rest in the knife edges of the eyes from which the pan is supported to swing down, throwing up the carriage, which is so connected as to cause the turning of the arbor and the movement of the pointer on the dial. The tension of the spring may be readily regulated, and a proper adjustment of the parts causes the indicator to show the weight of material in the pan. By means of a thumb plate the pan may be held rigidly, if it is not desired to utilize the weighing mechanism.

SMITH'S CHANGE-MAKING DEVICE.

To facilitate the changing of coins or bills by rapidly and accurately bringing out the required change by operating proper levers is the object of the invention illustrated by the accompanying figures, and which has been patented by Andrew A. Smith, of Westport, Wash. It comprises essentially a casing having a number of coin receptacles or hoppers, each of which contains coins of one denomination only, and mechanism by which one coin at a time may be produced from either of the hoppers. Fig. 1 is an outside view of the complete device, Fig. 2 showing a section through one of the hoppers. The case is intended to be placed at the rear of a counter, with its upper portion slightly above the surface—though not interfering with the display of goods by a salesman—a tube discharging the coins upon the counter opposite the case, as indicated in Fig. 1. The cover of the case is hinged, to afford ready access to the interior, and has a series of slots,



A NOVEL CHANGE-MAKING DEVICE.

beneath each of which is a coin receptacle similar to that shown in Fig. 2, the inclined projections in the receptacles preventing the removal of coin by turning the case over. In the sloping bottom of each coin receptacle is a slot which will pass but one coin at a time, and opposite these slots are coin-receiving cups having false bottoms attached to vertical rods on which are spiral springs, normally holding the cups in lowered position. The cup-supporting rods are, however, pivotally connected with levers whose outer ends project through slots in the casing, terminating in keys marked with the denominations of the coins in the different receptacles; and on the depression of the proper lever, when it is required to make change, the cup and its false bottom is elevated, the latter coming in contact with a pivoted discharge lever, the tripping of which causes the coin to be thrown into the discharge spout. One or more of the keys are thus depressed to operate the levers to discharge the required coin from the different receptacles, according to the change desired. The cover is provided with a lock, to prevent unauthorized access to the interior of the casing, and within the casing is a lock plate which may be moved to prevent operating the keys.

The Forgotten Colonial Library.

The tearing down of the building which covered the east wall of Independence Hall has brought forward some unexpected testimony in confirmation of the specifications, as well as some unanticipated facts which are of great interest and importance. The face of this wall shows unimpeachable evidence of a building having existed of which the present generation had no knowledge, and to which reference is made in all old documents, letters, etc., but which had dropped out of sight. It is barely a century since stood fully equipped the "Colonial Library," corresponding to our "Congressional Library" of to-day, from which public men indited their correspondence. Well might Scrooge say, "And are we so soon forgotten?" But it is hard to think that the existence of such a building should have had no record. It has, fortunately, left its own record on the wall of the old State House. Concerning the Colonial Library, Frank M. Etting's "History of Independence Hall" says, on page 26, a resolution was adopted in 1752 to place at the southeast corner of the State House a structure for the use of the committees and "for our books." Etting adds that "the absurdity of such a building must have prevented its accomplishment." But here is the unimpeachable evidence that it was built, and the further evidence of correspondence dated from it. It probably went down with the changes made in 1813.—Philadelphia Ledger.

GAS AND GASOLINE ENGINES.

The steadily increasing popularity of gasoline power for driving machinery and for propelling boats has led to the perfection of a gas and gasoline engine, by the Mianus Electric Company, Mianus, Conn., which is peculiarly fitted to supply the demand, excelling in economy, safety and durability. The company are manufacturers of complete gas or gasoline engines of from one to six horse power, both stationary and marine, and can supply the castings, parts and working drawings for the one horse power and two and one-half horse power engines, for experimental purposes and for those who wish to construct their own engines. The accompanying illustration shows the two and a half horse power "Palmer" marine gasoline engine, built on the two cycle compression type, with an impulse at each revolution of the crank. The company also build them on the four cycle type having an impulse every other revolution. These engines are readily adapted to motor carriages and are also used for running printing presses and dynamos for electric lighting. They occupy but little space and consume a small quantity of gasoline or gas.

New York's Population 3,438,899.

An official estimate of the population of Greater New York was given out February 10 by the Health Department as follows: Number of persons in all five boroughs, 3,438,899, of which 1,911,755 are in the borough of Manhattan; 137,075 in the Bronx; 1,197,100 in Brooklyn; 128,042 in Queens and 64,927 in Richmond.

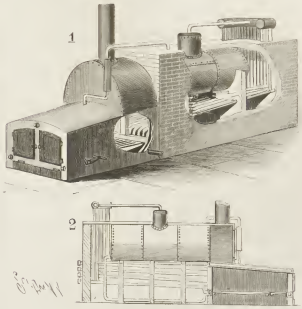
London, by the census of 1891, had 4,231,000 inhabitants, so that New York is about a million less. In 1891 Paris had 2,447,957 inhabitants, while in 1895 Berlin had 1,677,351, then comes Canton with 1,600,000, Vienna with 1,364,548 and Tokio with 1,214,113.

An Inexpensive Garbage Receptacle.

The committee on nuisances of South Park, Dayton, Ohio, is supplying a receptacle for holding garbage and rubbish which is very ingenious. The outside casing is a tile such as is in use for ordinary sewers. It is 18 inches in diameter and 28 inches deep. This tile is set in the ground, the top being about 3 inches above the surface. Into this is fitted a receptacle made of galvanized iron with a substantial bail for the convenience of persons handling the garbage bucket. It is hardly noticeable when the tile is properly inserted in the ground. It is covered by a neat cover. The cost of such a receptacle would be about $1.50.

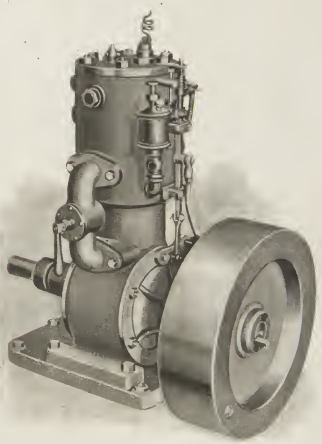
A WATER JACKETED FURNACE AND BOILER.

The accompanying illustration represents a furnace and boiler in which the furnace is water-jacketed on



INNES' STEAM BOILER.

its sides and top, and special provision is made to insure a perfect circulation and the rapid production of steam. The invention has been patented by Robert W. Innes, of No. 624 North Thirteenth Street, Omaha, Neb. Fig. 1 represents the boiler in perspective, with portions broken out to show the interior, Fig. 2 being a view in section. The fire box has a grate with forward movable section, rocking on a horizontal shaft, whereby it may be dumped by means of a crank at one side, and the top of the fire box water jacket is braced by central water legs at its front and rear, communicating with transverse water beams, the feed pipe entering the water jacket at the rear of the fire box. Extending rearwardly from the water leg and water beam at the rear of the fire box are water tubes which pass beneath and turn up at the rear end of the boiler, to communication with a U-shaped header, these tubes being in the immediate path of the products of combustion, and each tube having a rearward extension, provided with a plug, by removing which the tubes may be blown out. The center of the header



THE "PALMER" MARINE GASOLINE ENGINE.

is connected with the top of the steam dome, and a pipe leading from the forward portion of the boiler at the top is connected with a water column in front of the boiler and thence with the water jacket over the furnace, the column serving to indicate the condition of the water in the boilers. Water tubes also lead from the lower rear portion of the boiler to the water beam at the rear of the fire box. To make tortuous the passage of the gases rearward from the fire box, transverse baffle walls are arranged, each having a break therein, and the breaks being arranged at alternate sides, thus insuring the more perfect combustion of the gases.

Old Coins and Ancient Bankers

The Origin of Our Modern Methods of Commerce

By Walter H. Woodward

IT is to Lydia that Europe owes the invention of coinage. In all times and in all countries, the privilege of coining has been allowed the sovereign. Cræsus, of Lydia, was the first monarch to introduce a bimetallic system of coinage—gold and silver in the proportion of about three to four. This was some time between 560 and 546 B. C. Darius, of Persia, is said to have later adopted this idea also.

At a very early age the ancients found it necessary to discover some definite medium of exchange to take the place of the inconvenient method of bartering—the most primitive means of carrying on trade. Metal was chosen doubtless by reason of its durability, and in the case of gold and silver, by reason of their intrinsic value. Silver and brass were first used, particularly in Greece, from a lack of sufficient gold. Later, however, this deficiency was overcome in a manner to be described farther on.

The less liable a metal is to change in value, the better it is suited for a standard.

The first method of using precious metal as a medium of exchange was impracticable and inconvenient. It was simply weighed and exchanged, in full, for commodities of various sorts. Soon, as commercial transactions increased and became more complicated, it was found necessary to divide the mass into units of various weights, which took the form of rough coins. To this day there is one surviving relic (in name only) of this first system of payment by weight. It is the word *pound*. This division proved unsatisfactory also, since no two merchants were likely to have split their store of silver into pieces of equal weight. Their units could not be taken as a standard, since a piece of weighed metal becomes a coin only when it is stamped by the State, and is thus guaranteed to have its professed weight and purity.

The Greeks first issued real coin some time during the seventh century B. C. By the fourth century the entire civilized world used money. It is supposed that the priests played an important part in the introduction of money, for it is highly characteristic of them that their coins were from the start marked by religious association. So ancient coins in a great measure confirm history and have been, and in the years of discovery yet to come will doubtless continue to be, of the greatest help to historians.

In addition to illustrating events of history, these coins have also a direct and valuable bearing on the religious beliefs of the nations and tribes by which they were issued. The mythology of the Greeks has not been recorded by them in sacred books to any extent, nor handed down to later generations by a faithful and studious priesthood. Their mythology ran on unchecked, and having grown out of the beliefs of scores of various tribes, reaches us in a condition which scarcely admits of sytematizing. The Greek coins up to the death of Alexander bear only sacred subjects. Every coin issued bears a reference to some deity. Coins of Miletus, for instance, bear a lion; those of Eretria shows a cow and sucking calf; those of Cyzicus show a tunny-fish, etc. All these were symbols of the goddesses. The coins issued under the empire bear, as a rule, the imperial portrait on one side, and on the other a sacred emblem. The whole, then, affords us invaluable assistance in reconstructing Greek mythology.

Ancient coins are of almost equal value to the geographer as to the historian.

Then too the art of sculpture, of which coin engraving is an offspring, receives great illustration from a careful study of these coins. The memory of lost statues is preserved for us, and, particularly in the case of the Greek coins, we are afforded an example of that skill by which her sculptors attained such renown.

The history of Greece is one of a people continually torn by civil dissension. Their story is one of war and strife, forever between themselves, and in later years with outsiders. War is an expensive thing in more senses than one, though we have need to take note here of pecuniary costs alone. As the various States were jealous and always at odds, so were men, and as a consequence the religious temple was resorted to as a depository for the safekeeping of precious metals and jewels. These religious institutions played no unimportant part in the development of earlier Greek commerce. They held vast sums of gold plate, and this, together with fortunes of their own, derived from votive offerings, they employed productively for their own use. They loaned money at a high rate of interest, and this custom very likely suggested to others the idea of doing likewise. Pasion was probably the first to do this. He founded a house at Athens, operating with a capital of fifty talents. He established for himself first-rate credit at all centers of Greek commerce. In this way business could be transacted by the exchange of a sort of letter of credit in place of payment in coin.

The introduction of this system despite its small scale shows the growth of commercial activity. Money was now more plentiful, and all prices higher than ever before. This was due in a measure to the amount of precious metals, chiefly gold, which had been brought into circulation. War upon war led to the gradual coinage of the treasures which had for years been accumulating in the temples, and this new "banking" system put on the market money which would otherwise have been hoarded. The interest rate was high. Twelve per cent was paid for the loan of money. This fact is significant. It shows the thriving condition of industries. Capital was evidently in demand. With a fortune of fifty talents (less than $50,000) there would be yielded an income of $6,000. That sum of course then possessed far greater purchasing power than does an equivalent weight of gold to-day.

It might be well to say a word here concerning the origin of the term *bank*. Some authorities have it that its origin is found in the Italian word *banco*, a bench used by money changers in the market place. I am inclined, however, to favor the claim of other authorities, who maintain that the term takes its origin from the old German word *Banck*—a pile, mound, heap, as of precious material.

Greek bankers (*trapezitæ*) maintained their stands in the Agora, and combined in their vocation a number of other businesses. They changed money, bought foreign money at discount, furnished gold for export, loaned money to merchants on security of ships and their cargoes, and received sums on deposit for which they paid interest. They later on often acted as pawnbrokers, accepting gold plate and jewels, and other personal property.

We have no evidence that any of these ancient banks and bankers were ever guaranteed by the State, and very likely they were not. One exception may have existed, however, if we are to credit Aristotle, in the case of Byzantium.

In Rome, bankers are known to have existed as early as 309 B. C., their functions being practically identical with those of Greece. We have a trifle more reliable information concerning these Roman bankers than we have of the Grecian. Their various branches of doing business seem to have been as follows:

Their *Permutatio*, or exchange of foreign coin for Roman currency. For this they charged a commission or exchange. Subsequently, when the Romans acquainted themselves with the Greek method of bills of exchange, they received money which was to be paid at Athens, for instance, and drew a draft of exchange upon some Athenian banker with whom they ran an account.

Their *Depositum*, or keeping of sums of money for other persons. Cash might be deposited merely for safekeeping, in which case the banker (*Argentarium*) paid no interest. When a payment was to be made, the owner was required to draw a check, as in modern times. But the deposit might have been made upon the stipulation that interest be paid, in which event the transaction was called *Creditum*. The banker could then employ this money in his own interests.

In the event of failure of a bank, the law enacted that the claims of the *depositarii* should be satisfied before those of creditors who had money deposited to their credit at interest. The *Argentarii* never delivered money to anyone except upon receipt of a check, and the payment was made in cash, or if the person who received it kept an account with the same banker, the sum was credited to his account.

Of all receipts and expenditures these bankers kept an accurate account in books called *Codices*, and we have every reason to believe that they were familiar with double entry bookkeeping. Thus the *Argentarii* carried on a business almost identical with that of the modern bank. They combined with their regular banking business other avocations of a kindred nature. They often acted as agents at private sales and auctions. They acted as brokers, too, in the modern sense, and frequently undertook to sell entire estates as inheritances.

For many years the ancients maintained that charging interest partook of the nature of usury, and men of this profession did not enjoy the very highest reputation. After a time, though not escaping reproach, the higher class of bankers maintained a good name and enjoyed a reputation for honesty and ability. Their credit in all parts of the commercial world enabled them to raise on short notice large sums of money in foreign cities. Much confidence was finally placed in them, business often being transacted without witnesses, so they became in time a sort of unofficial notaries public.

The Le Verrier Centenary

LE VERRIER was born on March 11th, 1811, at St. Lo, in the Department of La Manche, France. This is the year, therefore, in which the entire scientific world celebrates the centenary of his birth. Undoubtedly he was one of the greatest mathematicians that ever lived. College undergraduates who fail in mathematics may find some consolation in the fact that despite his special aptitude, he failed to pass his examination at the Polytechnic in 1830. After graduating he was about to become assistant to Gay-Lussac, when he was offered the assistant professorship of astronomy at the Polytechnic School, which post he accepted. Thus he was fairly launched on an astronomical career remarkable for its brilliancy. His first astronomical monograph bore the title, "Memoire de Mecanique Celeste," and was published in 1839

Le Verrier, of course, is best known for his mathematical discovery of Neptune. Not only was a new planet added to the solar system, but the immensity of stellar distances was driven home. It was August 31st, 1846, that Le Verrier announced to the Academy of Sciences the theoretical position of a planet which caused the perturbations of Uranus, perturbations which were first discussed by the French astronomer Bouvard, and which for two decades and more were a source of much mathematical comment among astronomers. A few weeks after the announcement of the Academy of Sciences, Galle, in compliance with Le Verrier's request, directed his telescope to that portion of the sky indicated by Le Verrier, and found the star which we now call Neptune.

This brilliant success inspired Le Verrier to investigate the movements of every planet from the first to the last, from Mercury to Neptune, an immense labor, which completely shattered his health. He died on September 23rd, 1877.

The Current Supplement

THE opening article of the current SUPPLEMENT, No. 1840, describes two new breakwaters on the west coast of Jutland.—Technical chemistry has contributed a very important share in the successful development of aerial navigation. What chemistry has done for ballooning, for example, is well told by Mr. A. Sander, in an article entitled "The Preparation of Gas for Balloons."—The effect of radium on the higher animals is discussed in the light of Prof. London's researches.—One of the most important articles in the current SUPPLEMENT is Mr. Walter V. Turner's paper entitled "The Air Brake as Related to Progress in Locomotion."—The question of efficiency and economy in the management of industrial enterprises, as revealed by Mr. Harrington Emerson, is presented in a summary of the paper read by Mr. Emerson before Harvard University.—Mr. W. C. Phalen's paper on "Potash Salts" is concluded.—Some interesting new French toys of a mechanical nature are described and illustrated.—Mr. S. S. Hough discourses on the aims of astronomy of precision.

The Loss of Oil Entailed by Burning Wells

ACCORDING to the *American Machinist*, it has been estimated that there are lost annually more than a million and a half barrels of oil by the burning of oil wells.